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New York and Boston rapid transit Co.

Prospectus for a direct railway line between New York and Boston...

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PROSPECTUS

FOR A

DIRECT RAILWAY LINE

BETWEEN

NEW YORK AND BOSTON.

ISSUED BY

THE NEW YORK AND BOSTON RAPID TRANSIT CO.

OFFICES:

No. 8 CONGRESS STREET, BOSTON,

TREMONT BANK BUILDING, ROOMS 22 AND 23.

No. 146 BROADWAY, NEW YORK,

MUTUAL LIFE INS. CO.'S OLD BUILDING, ROOMS 406 AND 407.

BOSTON:
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1886.

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RAPID TRANSIT WANTED

BETWEEN

New York and Boston.

The conviction has become strong and general that commerce and travel demand more rapid transit between New York and Boston, the two great and growing commercial centres on the Atlantic Coast. From New York direct and rapid communication is already established in every direction, except the East. Merchants, bankers, business men, and travelers are all fully agreed that the existing transportation time between the two cities, being six to eight hours by rail and twelve to fourteen hours by rail and boat, should be reduced to a figure that shall more nearly correspond to the pressing requirements of the day. Time is money in the modern methods of business, and the economy of it is therefore of the first importance. A nearly direct railway line connects London and Liverpool, over which the passage is made daily at a high rate of speed. The communication between St. Petersburg and Moscow is similar. And no fact is now better established than that an immensely increased passenger traffic invariably results from this direct and rapid communication between important centres. The law is fully recognized that increased traveling facilities beget a corresponding increase of traffic, and hence direct railway lines are the ones chiefly in public demand.

There is to-day no direct line between Boston and New York for the quick transportation of passengers, mails, and freight. The actual separating distance is less than one hundred and

ninety miles, and it is capable of being overcome easily in less than three and one half hours. In such an event the merchant or banker or business man will not, as at present, be obliged to make his journey on one day in order to transact his affairs on the next, but may breakfast at home, discharge his business in the other city, and return to sup at his own table again, and sleep in his own bed at night. Men who now travel from one city to the other only when necessity compels them will then go as often as they choose, with no more trouble and at the cost of but little more time than they would expend in a daily suburban excursion.

Statistics show that the through travel between the two cities is rapidly increasing, the rate of increase being not less than 17 per cent annually for the past seven years, and 25 per cent annually for the past two years. Upon such an assurance the demand for rapid transit cannot fail to be soundly based.

The distances between Boston and New York by the existing railway lines are: *Via* Springfield, 236 miles; *via* Providence, 234 miles; *via* Willimantic and Middletown, the so-called air line, 214 miles. The numerous grade crossings of highways and railways, the draw-bridges and ferries, the heavy grades and sharp curves, make it impracticable to run trains over any of these lines from city to city in less than six hours.

A direct line of railway can be constructed, on which trains can be run from city to city in about three and one half hours.

The charters for such a line have been secured in New York, Connecticut, and Massachusetts, and over $300,000 has been expended in making surveys and estimates, in the purchase of land, in grading, and doing other work required to make the franchises practically perpetual.

The charters in Connecticut and Massachusetts were endorsed and approved at the last sessions of the legislatures of those States, by a special act extending the time in which to construct the railroads.

It is proposed to build a railway line between these two cities that will be in all respects superior to any railroad on this Continent and the equal of any in the world.

This railroad will not have any crossings at grade of highways or railroads. It is to be so constructed that no person or animal can get upon the track between New York and Boston without

climbing a fence. On this road it will be possible to run trains between the two cities without making a stop. It will have no grades of more than fifty feet to the mile, and no curves of more than two degrees.

Such a railway can be constructed and equipped for less than $25,000,000.

Such a railway will earn, above operating expenses, more than 5 per cent on $50,000,000 the first year after its completion.

Such a railway can be constructed and put in operation in about twenty months.

These statements are fully substantiated by the testimony of many eminent and well-known railway managers and engineers. The following summary, prepared by one of the foremost railway managers and constructors in the United States, is submitted : —

Important Facts and Statistics.

which demonstrate the need of a direct line of railway between New York and Boston :

1. There is now but one line of railroad from New York to the East, and no railway line between New York and Boston under one management. This one line aforesaid runs east to New Haven, and from thence has three branches leading to Boston, which branches are owned by other corporations. The broken and indirect lines are controlled by four companies, and none of them were projected to secure rapid transit between New York and Boston, but as local roads.

2. The amount of capital represented in these lines is about $75,000,000, or three times as much as the proposed new line will cost.

3. The capacity of the proposed direct line for freight and passenger traffic will be fully or more than equal to any two of the others combined.

4. The amount of capital represented in the line *via* Springfield and New Haven is over **$41,000,000.**

5. The cost of the proposed direct line will be less than $25,000,000, or 60 per cent in favor of the direct line.

6. The best time made *via* Springfield and other routes, express time, is six hours; that *via* limited express on the direct line will be three and one half to four hours, with a saving of about forty miles in distance and two hours in time.

7. The two principal lines now existing between the two cities have an average in round numbers of *two grade* crossings per mile and seven and one half draw-bridges to pass.

8. The proposed direct line will have *no grade crossings and but two draw-bridges.*

9. The amount of freight passing between the cities of New York and Boston in 1885, exclusive of the outside all-water (Metropolitan) line, was 1,103,483 *tons*, or 3,525 tons *one way* daily for 313 working days.

10. The number of passengers in 1885 was 837,467, or an average of 2,675 daily one way for 313 working days of the year, and 1,337 each way.

11. The increase of passenger traffic between the two cities for the seven years ending 1884 was *an average* of 17 per cent per annum, or 119 per cent in that time. And the increase from 1884 to 1885, for a single year, was over 24 per cent.

12. The proposed direct line will be 9½ per cent, twenty-one miles, shorter than the *shortest*, and 18 per cent, or forty-two miles, *shorter* than *the longest* of the existing lines.

13. To show the capacity for supporting railroads of the country traversed by this line, take for example the New York, New Haven & Hartford road. It has 132 miles of its own line, and 133 miles of leased lines — nearly all the leased lines being single-track roads and short lines.

14. The New York, New Haven & Hartford directors, after laying out large sums upon new iron and steel bridges, stone ballasting, and other permanent and costly improvements, admit in their report for 1884 net earnings of $2,278,772

Besides the amount earned and paid to the Harlem road, but not charged in above 313,575

Making net earnings between the terminal points, after all heavy outlays, of $2,592,347

Or 5 per cent per annum upon about **$52,000,000.**

15. Allowing that the 133 miles of single-track leased lines earn $3,250 per mile net, which is 5 per cent on **$65,000** (and a liberal estimate for their share of the earnings), the main line would then earn **$16,364** *per mile net* on **132** *miles*, which is 5 per cent on **$327,280** for every mile of their road, and (2½) two and a half times as much per mile as the proposed direct line would be required to earn to pay the interest at 5 per cent on its cost at **$130,000** per mile.

This large showing is made, too, upon the assumption on their part that the cost of operating is 70 per cent of the gross earnings.

Sixty per cent is ample for operating expenses proper, after charging new construction, etc., to their proper accounts.

Upon the basis of 60 per cent for operating, the net earnings would be **$19,637** *per mile* on the 132 miles, or more *than three times as much* as the fixed charges upon the proposed direct line. It may be proper in this connection to add that this company divides 10 per cent per annum upon its large capital, and its stock is worth more than $200 per share.

16. New Haven is the great centering point for all eastern and southwestern travel between all New England, the maritime British Provinces, and the cities of New York, Philadelphia, Baltimore, Washington, and the Middle and Southwest States. The facilities now afforded between New York and New Haven are entirely inadequate for the immense volume of traffic that now flows between those points, and which is increasing from 15 per cent to 20 per cent annually. There is at present business for two first-class roads between those cities, and but a few years will elapse, at the present rate of increase, before they will be taxed to their full capacity.

17. The distance between New York and New Haven *via* that line is seventy-three miles; and the quickest time now made by their trains is *two hours*.

The distance between the same points *via* the new line will be sixty-nine miles, and will be run by the limited express in one hour and twenty minutes and by the regular express trains in one hour and a half.

18. This proposed direct line will reach all the principal towns and cities, as Milford, Willimantic, Middletown, New Haven,

Bridgeport, Norwalk, Stamford, etc.; and will bring the cities of Worcester and Providence, comprising, with their immediate surroundings, over 300,000 people, more than twenty miles nearer to New York than by their present connections.

An Estimate of Earnings.

No one will deny that a line carrying passengers, mails, perishable goods, express-freight, etc., demanding rapid transit, that can run trains between the two cities two hours quicker than any competing line, will command a large share of the business. The line between London and Liverpool, 214 miles, that saves fifty-five minutes over any of its competitors, has for some years carried over 80 per cent of the through passengers. The following very conservative estimate of the probable earnings of the proposed direct line is furnished by a railway manager of the largest experience: —

EARNINGS FIRST YEAR,

based on the actual business done between the two cities for the year ending Sept. 30, 1885: —

Forty per cent of through passengers, is 334,986, at $5.00 each	$5,674,932
Thirty-three per cent of through freight, 1,108,000 tons, including 369,333 tons of perishable goods — fruit, fish, etc., at $4.00 per ton	1,577,332
Mails and express, [the actual sum now earned by the line *via* Springfield being $785.410]	350,000
Local business, including that from all "feeders" from the North,	975,000
Total earnings first year	$4,577,262

EXPENSES.

Sixty per cent for operating expenses	$2,746,357	
Rentals, etc., on terminals in New York and Boston, being 16 cents on passengers, and 25 cents per ton on freight	145,927	
Interest on $25,000,000 of bonds at 5 per cent	1,250,000	$4,142,284
Leaving surplus for stockholders		**$434,978**

It is believed that such a line would carry more than 60 per cent of the through passengers, and that the freight earnings would be largely in excess of the foregoing estimate. The best authorities also agree that the operating expenses of a straight line, without crossings at grade, and constructed as this line will be, would be much less than 60 per cent of the gross receipts. If these opinions be a safe guide, it may be estimated that the surplus for stockholders would be four or five times the sum above named.

SECOND YEAR.

The carrying trade between the two cities has increased over 20 per cent each year during the last five. Assuming that the business of the direct line increases but 10 per cent, the account at the end of the second year would stand: —

Gross earnings		$5,364,988
Operating expenses and terminals	$3,218,991	
Interest on bonds	1,250,000	
		4,468,991
Surplus for stockholders		$895,997

THIRD YEAR.

Gross earnings		$5,901,478
Operating expenses and terminals	$3,542,886	
Interest on bonds	1,250,000	
		4,792,886
Surplus for stockholders		$1,108,592

For Local Business Only.

It has been demonstrated to the satisfaction of many prominent railway managers that, simply as a local road, without any through traffic, it would be profitable to construct a railway over this direct line between New York and Boston. The road from New York to New Haven will accommodate the almost continuous line of

cities and villages equally as well as the old road, and in many places will much better serve the passenger traffic; while it passes through the city of Norwalk and other places that are now at a distance from any railroad. The enormous and rapidly increasing local business in this sea-shore suburb of New York will make this portion of the direct line very valuable property.

The saving of distance and time between New York and the cities of Bridgeport and New Haven will insure to this part of the line a large share of the business. The direct line will be about FIVE MILES shorter than the old line; and, by reason of having no crossings at grade and only two draw-bridges (while the old line has six) and no curves that decrease speed, trains can be run more rapidly and with greater safety. The best authorities agree that by the direct line at least thirty, and probably forty, minutes' time can be saved between New York and New Haven, even when the old road shall have completed all its contemplated improvements.

The eastern portion of the line, from New Haven to Boston, will also yield a large local trade. The cities of Middletown and Willimantic, with numerous villages and towns, will have much better accommodations than now. The cities of Providence and Pawtucket, R. I., and Worcester, Mass., will be brought more than twenty miles nearer New York than by any existing line. The road in Massachusetts will certainly prove a profitable investment as a local road. Milford and numerous thriving villages will be brought twelve to fifteen miles nearer Boston than by the present railway connections, and a large suburban business will be secured within fifteen miles of that city.

Not a Parallel Road.

This direct line will not parallel any existing railroad. There is no railroad between New York and Boston. The roads by which rail communication is now possible were built as local roads. They run from town to town, and were largely built from subscriptions by these towns. None were projected to secure the carrying trade between the two great cities. A line that is twenty or forty miles shorter than any other line cannot properly be termed a parallel line. A line that will carry passengers, mails, and

freights two hours quicker than any other line can possibly do, is not a parallel line. Therefore, it is just to claim that the term "parallel road" as used in connection with the West Shore, the "Nickel Plate," or the Massachusetts Central, does not apply to this project.

Construction and Cost.

The work preliminary to the construction of this line has been steadily and carefully prosecuted during the last three years. Prior to 1882 surveys and estimates were made, and the first steps taken towards securing charters in the different States. In spite of the strong and persistent opposition of the managers of the existing lines, these charters have been made practically perpetual by complying with all the requirements of the statutes of New York, Connecticut, and Massachusetts. The struggle continued for three years in Connecticut and Massachusetts, but practically ended in the early part of 1885. During these years the line was again and again surveyed, with a view of securing more accurate estimates of the cost of construction and of improving the alignment. This work was done by different corps of engineers; and, although their reports were satisfactory to those who controlled the enterprise, they were not in a consolidated form, such as a capitalist would require if desiring to obtain a clear and comprehensive knowledge of the status in a short time.

The New York & Boston Rapid Transit Company.

Up to this juncture the franchises in the several States, the engineers' work, the land purchased, and the work of construction done to secure the charters, were owned by two companies, which for convenience may here be known as the New York Company and the Massachusetts Company. The New York Company, owning the franchise and work done between New York City and New Haven, had expended about 155,000. The Massachusetts Company, owning the franchise and work between New Haven and Boston, had expended about $150,000. The persons com-

posing these two companies, in order to unite their interests, organized THE NEW YORK & BOSTON RAPID TRANSIT COMPANY. This is a joint stock corporation with a capital of $750,000, divided into 15,000 shares of $50 each. The stock was immediately taken up, principally by those composing the two original companies. The Rapid Transit Company then purchased all the property of the companies owning the charters, and began preparations for building the road. Further details, with names of officers and shareholders, are supplied by the prospectus of the company.

Reviewed and Revised.

The first step taken was to obtain from engineers of world-wide reputation, whose reports would be accepted as final by capitalists in this country and Europe, a review and revision of the surveys and estimates of cost of construction previously made. After careful inquiry it was decided that the highest authority on engineering in the United States was Gen. Wm. J. McAlpine, of New York. Gen. McAlpine is nearly as well known in Europe as America, having been employed at various times in England and Austria on important public works. He has been State engineer of the State of New York, engineer in chief of the United States Navy at Brooklyn, chief engineer of the Erie Railway, the Galena and Chicago Railroad, the Ohio and Mississippi Railway, chief engineer of water-works at Brooklyn, Chicago, and Albany, and chief of many other important engineering contracts.

The services of Gen. McAlpine having been secured by the Rapid Transit Company, he selected, as the engineer above all others the most competent to go over the whole line and review the surveys, MR. J. N. GREENE, of New York. Mr. Greene is well known throughout the United States as a practical railroad builder of thirty years' experience. He was (1) engaged as an engineer in the construction of the Michigan Central Railway, (2) was assistant engineer on the New York State Canals, (3) resident engineer on the New York & Erie Railway, (4) locating engineer on the Atlantic and Great Western and on the Albany

& Susquehanna railroads, (5) resident engineer of the Missouri Pacific Railway, (6) chief engineer (on the government work) of the Portage Lake and Lake Superior Ship Canal, (7) chief engineer of Jacksonville & Mobile Railway. He has also been chief engineer in charge of several railroads in Maine and New Brunswick, and is now president of the Shore Line Railway of Maine and New Brunswick.

An Important Task.

In the work required of them, Messrs. McAlpine and Greene were assisted by Engineer Wm. Rotch, of Boston, who had been consulting engineer for the Massachusetts Company during the last four years, and Engineer Franklin Mead, of Boston, who has been engaged on the line since the first surveys were made. They were asked to report in detail the cost of constructing a first-class, double-track railroad between New York and Boston, as good a road as can be built, and to report how rapidly trains can be run with safety over such a line. They were requested to make specifications for a better railroad than has yet been built in this country, or in the world, a road without any crossings at grade of railways or highways, and equipped with the best rolling stock that can be obtained, and with all modern improvements.

The Work Well Done.

In the course of about three months the work was completed, and the reports made to the New York & Boston Rapid Transit Company. They have been read and carefully studied by many of the most prominent railroad presidents and managers in this country, and are unanimously pronounced most comprehensive and complete. They supply full details of the work to be done in constructing the line, the amount and cost of every foot of earthwork, cutting and filling, masonry, bridges, etc The principal portion was written by Mr. Greene. In closing he says: —

"Thus ending the review of the course and general features, I will now proceed to give some of the characteristics in detail, to show the kind of railway

it is proposed to build, and the cost and manner of its construction. The estimated cost of right of way is $5,144 per mile.

Average cost of steel and iron bridges, $6,640 per mile.
Average amount of earth, 103,300 cubic yds. per mile.
Average amount of rock, 16,860 cubic yds. per mile.
Average amount of bridge masonry, 1st and 2d class, 1,200 cubic yds. per mile.
Average amount of culvert masonry, dry, 335 cubic yds. per mile.
Average lineal feet iron viaduct, 49 feet per mile.
Average amount stone ballast, 6,260 cubic yds. per mile.
Weight of rail in main track, 254 1-2 tons per mile.
Weight of angle plates, 31,000 lbs. per mile.
No. of ties 7 in. thick and 9 feet long, 2,880 per mile.

And the total cost per mile of road, including first-class equipment, interest account during construction, right of way, etc., as shown in Schedules A, B, C, D, E, and F, herewith annexed, is in round numbers $130,000.

This, at first glance, may seem like a large sum; but it must be remembered that it is to be constructed on the shortest practicable route between the great commercial cities of New York and Boston; that the line traverses a very difficult and expensive region, cutting all the water-ways and intervening ridges at very near right angles; that the plan is made for maximum grades of 1 per cent and minimum curves of 2 degrees or 2,865 feet radius, with a large part of them as low as 1 degree and 1 1-2 degrees; that all the crossings of railways and highways are over or under this railway, and not one at grade for its entire distance; that the girders and bridges, from 15 up to 340 feet openings, are first-class steel and iron, and the masonry also first class; that the ballast is to be 19 inches deep, of broken stone, for double track, with ample turn-outs, switches, frogs, electric signals of the latest and best designs; the rail 81 lbs. per yard, of best steel (which is 12 1-2 per cent heavier than any road in the country), with all fastenings, plates, bolts, spikes, and ties of extra weight and size, to correspond with the rails; that the motive power is to be first class, with engines of extra cost and superior mechanism for fast passenger traffic, and all other rolling stock to be of the very best; that the most fearful source of danger and slaughter under the name of accidents on all the railways in this country (viz. grade crossings of other railways and highways) is to be entirely done away with; that, while the rolling stock is not to be increased in weight to any appreciable extent over that now used on all the roads in this country, the track and superstructure (above sub-grade) of this road will have at least 25 to 35 per cent more permanency and resisting power for heavy trains and high speeds, and, on account of its easy curves and superior alignment, a much higher degree of safety. When these, and the further fact that very many of the roads in this country have cost much more than the above estimate, and that all the railroads in Europe cost from $150,000 to $250,000 per mile, are taken into account, it will be seen that this railway will not only be the best, but a comparatively cheap road.

I will remark here that I have traveled over and examined the best roads in this country and in England, Scotland, France, and other continental countries of Europe; and I confidently assert that this road, honestly constructed upon the plan herein set forth, will be superior to any of them.

The distance *via* this proposed direct line to a point 3 miles south of Harlem River in New York is 193 miles.

Distance between same points *via* Boston & Albany, New York & New Haven & Hartford, 236 miles.

Distance between same points *via* Boston, Providence and Shore Line, 234 miles.

Distance between same points *via* New York & New England & Hartford, 224 miles.

Distance between same points *via* New York & New England and the Air Line *via* Middletown & New Haven, 214 miles.

This makes a saving in favor of the proposed direct line over all these lines as follows: —

B. & A. and N. Y. & New Haven, *via* Springfield, 42 miles.
B. & P. and N. Y. & New Haven, *via* Providence, 40 miles.
N. Y. & N. E. and N. Y. & New Haven, *via* Hartford, 30 miles.
N. Y. & N. E. and N. Y. & New Haven, *via* Air Line, 21 miles.

The quickest time now made between the cities of New York and Boston is 6 hours, as follows: —

B. & A. & New Haven, 6 hours, 39 1-3 miles per hour.
B. & P. & New Haven, 6 hours, 39 miles per hour.
N. Y. & N. E. *via* Hartford & N. H., 6 hours, 37 1-3 miles per hour.
N. Y. & N. E. *via* Middletown & N. H., 6 hours, 35 1-2 miles.

This time I do not think can be shortened over any of these lines more than half an hour at the best, which will make the speed respectively in the order as above:

B. & A. & N. H., including stops, 43 miles per hour.
B. & P. & N. H., including stops, 42 54-100 miles per hour.
N. Y. & N. E., including stops, 40 73-100 miles per hour.
N. Y. & N. E. & Air Line, including stops, 38 73-100 miles per hour.

The first figures show the fastest time now made per hour, and I do not see how they can better it much in view of the heavy grades, sharp curves, and great number of grade, highway, railway, and draw-bridge crossings they have to make. The second figures show the average speed per hour, including stops, that would be necessary to cover the distance in 5 1-2 hours. The difference in distance between two chief competing lines, the B. & A., *via* Springfield, and the Boston & Providence and Shore Line, is only two miles. The first has 60 feet grades and sharp curves, and the second has a ferry at New London, which is a sure hindrance of 15 to 20 minutes to every train.

The third line, the N. Y. & N. E., in connection with the N. Y. & N. H. at Hartford, has too many changes and grades; and, if the Air Line from Willimantic to Middletown and New Haven is used, it cannot I think, be made a serious competitor, on account of its very heavy grades (between 80 and 90 feet, I am told, by men operating the road) and sharp curves. In my judgment neither of these lines, as at present constituted, can ever safely make the distance between the two cities in less than 5 1-2 hours; and it is quite certain they will never do it in less than 6 hours, so long as there is no free and healthy competition, and as long as the present monopoly between New York and all New England maintains and holds its present undisputed power.

The route *via* Springfield and Hartford and New Haven, 236 miles, has 522 highway and 8 railway crossings at grade, and 6 draw-bridges, or an average of 2 27-100 crossings per mile, or one in every 2,320 feet for the whole distance.

The route *via* Providence & Shore Line, 234 miles, has 348 highway, 6 railroad grade crossings, and 9 draw-bridges, or an average of 1 55-100 crossings at grade in every mile, in addition to the detention at New London Ferry.

The New York & New England, *via* Hartford, 224 miles, has 306 highway, 7 railroad grade crossings, and 6 draw-bridges, or an average of 1 42-100 crossings at grade in every mile.

The proposed direct line, 193 miles, will have no grade crossings and only 2 draw-bridges. The limited express can be run over this line between New York and Boston in 3 1-2 hours, 55 miles an hour; thus saving 2 1-2 hours in time over the best railroad facilities that now exist between the two cities.

Having thus gone carefully over and made a personal examination in the field of this entire line from Forest Hill station, about 4 miles from Boston, to the Harlem River, and gone as thoroughly into detail as my time would permit, I have condensed the result into careful detailed estimates, as shown in schedules hereto annexed.

The manner of making up estimates for cost of right of way is explained in schedules under that head, and I would further say that the valuations of lands as used for present purposes were verified by getting values and prices from many people in the country through which we passed.

All of which is most respectfully submitted,

JOSEPH N. GREENE, *Civil Engineer.*

NEW YORK, Jan. 5, 1886.

Gen. McAlpine's Endorsement.

To the President and Directors of the New York & Boston Rapid Transit Company:—

I have carefully examined the foregoing report and estimates of the New York & Boston Rapid Transit Railway, and have received explanations from your engineer, Mr. Greene, which, with my particular knowledge of a great portion, and a general one of the remainder of the route, enable me to state as follows:

The report bears internal evidence of great care in the revision of the location of the line, the necessary recalculation and corrections of many of the quantities, and particularly of the determination of the quantity of rock excavations, always a difficult matter, as the depths of the earth coverings must be ascertained with much judgment and practical experience.

The plans of construction as stated in the report and estimates are for the very best description of railway, intended for the most economical transport and a very high (safe) speed of the passenger trains.

Indeed, if these plans are faithfully carried out, this railway will be of a construction superior to any in the United States, or even in Europe.

It is remarkable that at this late day a line should have been found through so populous a district, and serving so many of the towns of New England, without the delays and cost of passing through the expensive portions of the large cities and towns, and equally remarkable that there will not be a single crossing at grades of other railways, or even of any of the highways.

I have known Mr. Greene as an engineer of high standing for twenty years, and have heretofore had occasion to examine similar reports made by him.

Knowing of his long practical experience in railway construction, and of his careful and skillful habits of investigating and estimating the values of railroad works, I feel entire confidence in the accuracy and reliability of the foregoing report and estimates, more particularly, as I have examined them both in detail and in the aggregate.

I have no hesitation, therefore, in stating my opinion that the above estimates are ample, and my belief, that if this railway is faithfully built upon the plans specified, that its actual cost will not exceed $24,000,000.

This railway, built in this greatly superior manner, and with the advantages of shortness of line, easy grades, slight curvatures, and the absence of danger and delay from railroad and highway crossings, and only two draw-bridges, must of necessity command and forever retain a large share of the existing traffic between New York and Boston, which, in my best judgment, will be amply sufficient to pay a fair net revenue upon the expenditure required.

Respectfully,

WM. J. McALPINE, *Consulting Engineer.*

NEW YORK, Jan. 6, 1886.

Engineer Rotch's Endorsement.

BOSTON, Jan. 13, 1886.

To the President and Directors of the New York & Boston Rapid Transit Company: — GENTLEMEN, Having been consulting engineer of the New York & Boston Inland Railroad Company during the last four years and a half, from the time when the first surveys were made by that company for the construction of a direct line between the cities of New York and Boston, and having made a personal examination of a large portion of the country through which the line would pass, and having from time to time made detailed estimates of the cost of a first-class double-track road similar to the one described in the foregoing report of Mr. Joseph N. Greene, civil engineer, I desire to state to you that a careful examination of his report convinces me that he has in a most thorough manner examined the proposed location of the road, and that the estimates which he has made are the result of a most careful consideration of the nature of the country through which the road must pass, and of the requirements of a railroad which shall be superior to any in America, and equal, if not superior, to any in Europe in the stability and thoroughness of its construction and the safety of its operation.

I concur with Mr. Greene in his estimates and conclusions, and believe it is possible to accomplish the results which he claims. After making a large allowance for contingencies which it is impossible to foresee, I wish to express to you my conviction that a first-class double-track railroad can be built between New York and Boston, with no grade crossings of railroads or highways, with only two draw-bridges, with maximum grades of one per cent, and maximum curves of two degrees, with a length not exceeding 192 or 193 miles from the Boston & Providence depot in Boston to the Harlem River bridge at 2d Avenue, New York City, and at a total cost of not more than $24,000,000, including equipment and interest during construction.

Upon such a road I claim to be far within bounds when I state that trains can be run with perfect safety in less than four hours, or one and a half hours less than the best time which it is possible to make on any existing road.

In conclusion, I wish once more to express my concurrence in the admirable report of Mr. Greene, whose wide experience and practical ability have enabled him to present the subject with all its details in a most clear and forcible manner. Respectfully submitted,

(Signed) WM. ROTCH, *Civil Engineer.*

Further Details.

The reports supply detailed description and carefully made estimates of the right of way. The new line will accommodate the local traffic of all the towns and cities between New York and New Haven better than the old road, and less than twenty buildings will be disturbed — none of them valuable. From New Haven to Boston the land damages will be very light. All the estimates are believed to be far in excess of what the right of way will actually cost. Every acre of land to be taken has been viewed and its cost considered. Nearly all the more valuable land has been bonded. The summary given is as follows: —

From Forest Hills station, in Boston, to the Connecticut State line;	$130,080
From Connecticut State line to New Haven	245,435
From New Haven to New York State line	286,815
From New York State line to New York City	204,000
And for contingencies	75,000
Total	$941,330

Or an average of $5,144 per mile for 183 miles of road.

Summary of Cost.

The total cost of 183 miles of double-track road ready for the rolling stock, with eighty-one pound steel rails, first-class masonry, nineteen inches of stone ballast, all bridges of iron, no grade crossings, first-class depot buildings, with gates at each station similar to those in use on the New York elevated roads, and all modern improvements in signals, switches, etc., will be	$19,556,234
Shops and other buildings	235,345
Rolling stock (See details)	1,830,500
Interest on capital during construction (estimated two years)	1,200,000
Engineering during construction, etc.	315,000
Dwellings and tool-houses for section men	12,000
Contingent expenses	75,000
	$22,946,579

Or $125,489 per mile.

Rolling Stock.

10 large fast passenger engines	$11,000 =	$110,000
45 18 by 24, say 45 ton engines	7,500 =	412,500
750 box freight cars, 20 ton capacity	500 =	375,000
350 flat and coal cars, 20 ton capacity	400 =	140,000
80 first-class passenger cars	5,000 =	400,000
14 parlor cars	7,000 =	98,000
10 boudoir cars	12,000 =	120,000
15 baggage and express cars	3,500 =	56,000
12 mail and postal cars	4,000 =	48,000
12 smoking cars	4,000 =	48,000
10 snow plows	1,000 =	10,000
30 hand cars	100 =	3,000
4 wrecking and repair cars	2,500 =	10,000
Total		$1,830,500

Transportation Statistics.

The transportation business between Boston and New York for the two years ending Sept. 30, 1885, obtained from reliable sources, shows the total number of passengers and tons of freight carried by the four rail and boat lines, as follows: —

	No. Passengers.	Tons Freight.
Year ending September 30, 1884	673,000	1,062,287
Year ending September 30, 1885	837,465	1,103,483
Total for the two years	1,510,465	2,165,770

In addition to the above freight tonnage, 220,000 tons of freight were transported between the two cities by outside boat lines during the year ending Sept. 30, 1885.

There is also the item of express and mail transportation, which is a large one, that the proposed line would command over other lines of inferior facilities and despatch.

Tributary Railway Lines.

The number of passengers carried during the year 1885, by railway lines that will be tributary to the proposed direct line between New York and Boston was: —

Danbury & Norwalk Railroad, making connections at Norwalk	430,143
Hartford & Conn. Valley	345,630
Housatonic Railway, making connections at Bridgeport	340,954
Naugatuck, making connections at Bridgeport	599,272
New Haven and Northampton, connecting at New Haven, and draining the whole West Connecticut River valley from North Adams, Mass., and connecting with the Central Vermont system	490,453
New London & Northern Railroad, connecting at Willimantic, draining the whole Eastern Connecticut River valley from Brattleboro, Vt.	407,351
Norwich & Worcester Railway, connecting at Putnam, Conn., and by which Worcester, Fitchburg, and many other cities and towns will be brought over twenty miles nearer New York than by any existing line	507,233
Total	3,121,036

The number of tons of freight carried by these lines during 1885 was 2,159,695.

By the Providence and Worcester Railroad connection may be made from Providence, Pawtucket, and Woonsocket at Uxbridge, and these and adjacent cities brought nearly twenty miles nearer New York than by any existing line, accommodating a population of about 170,000.